

## REMARKS

Applicant respectfully requests re-consideration of the application in view of the arguments presented below.

### Summary of Office Action

Claims 1-36 are pending.

Claims 1 and 2 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,178,241 of Zhou ("Zhou").

Claims 5-8, 11-12, 21, 23, 26, and 32-36 were rejected under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 5,881,129 of Chen, et al. ("Chen").

Claim 3 was rejected under 35 U.S.C. § 103 as being unpatentable over Zhou in view of U.S. Patent No. 4,984,266 of Smith ("Smith").

Claim 4 was rejected under 35 U.S.C. § 103 as being unpatentable over Zhou in view of U.S. Patent No. 4,609,781 of Gay ("Gay").

Claims 9 and 25 were rejected under 35 U.S.C. § 103 as being unpatentable over Chen in view of Smith.

Claims 10, 15-20, 22, and 24 were rejected under 35 U.S.C. § 103 as being unpatentable over Chen in view of Gay.

Claims 13 and 27 were rejected under 35 U.S.C. § 103 as being unpatentable over Chen in view of Zhou.

Claims 14 and 28-31 were indicated as being allowable if re-written.

Response to 35 U.S.C. § 102 rejections

Claims 1-2 were rejected as being anticipated by Zhou. Claims 5-8, 11-12, 21, 23, 26, and 32-36 were rejected as being anticipated by Chen.

With respect to claim 1, Zhou includes a disclosure of a subscriber line interface card. A SLIC senses the tip and ring lines of the subscriber loop. A SLAC converts digital voiceband data from the PCM interface of the line card into analog voiceband data for the subscriber loop. The SLAC also receives analog voiceband data from the SLIC and converts the analog data into digital voiceband data for communication to the PCM interface of the line card (see, e.g., Fig. 2, col. 1, line 53 through col. 2, line 32).

Applicant submits Zhou does not teach or suggest incorporation of a signal processor as claimed by applicant onto the same integrated circuit as the codec. In particular, Zhou does not teach or suggest a signal processor that has sense inputs for sensed tip and ring signals of a subscriber loop, wherein the signal processor resides on the same integrated circuit die as a codec for bi-directional communication of voiceband data between the subscriber loop and a digital interface of the signal processor.

In contrast, claim 1 includes the language:

1. *A subscriber loop interface circuit apparatus comprising:  
a signal processor having sense inputs for a sensed tip signal and a sensed ring signal of a subscriber loop, wherein the signal processor generates a linefeed driver control signal in response to the sensed signals, wherein the signal processor resides on a same integrated circuit die as a codec for bi-directional communication of voiceband data between the subscriber loop and a digital interface of the signal processor.*

(Claim 1, as amended)(emphasis added)

Applicant thus submits claim 1 is not anticipated by Zhou.

With respect to claims 5 and 21, applicant respectfully submits Chen does not teach or suggest inclusion of the signal processor and the codec within a same integrated circuit. To the contrary, Chen's codec clearly resides outside the integrated circuit of Figure 1. Thus Chen does not teach or suggest a signal processor configured to receive a sensed tip signal and a sensed ring signal of a subscriber loop....and a codec for converting digital voiceband data to analog voiceband data for the subscriber loop, *the codec and signal processor residing within a same integrated circuit.*

In contrast, claims 5 and 21 include the language:

5. An apparatus comprising:

a signal processor generating subscriber loop control signals in response to a sensed tip signal and a sensed ring signal of a subscriber loop; and

a linefeed driver portion for driving the subscriber loop in accordance with the subscriber loop control signals, the linefeed driver portion providing the sensed tip and ring signals, wherein each of the linefeed driver portion and the signal processor resides on an integrated circuit die, *wherein the signal processor resides on a same integrated circuit die as a codec for bi-directional communication of voiceband data between the analog subscriber loop and a digital interface of the signal processor.*

(Claim 5, as amended)(*emphasis added*)

21. A subscriber loop interface circuit apparatus comprising:

a signal processor configured to receive a sensed tip signal and a sensed ring signal of a subscriber loop, wherein the signal processor generates subscriber loop linefeed driver control signals in response to the sensed tip and ring signals; and

a codec for converting digital voiceband data to analog voiceband data for the subscriber loop, *the codec and signal processor residing within a same integrated circuit.*

(Claim 21, as amended)(*emphasis added*)

Thus claims 5 and 21 are not anticipated by Chen.

Given that claims 2-4 depend from claim 1, claims 6-14 depend from claim 5, and claims 22-36 depend from claim 21, applicant submits claims 2-4, 6-14, and 22-36 are likewise not anticipated by Chen or Zhou.

Applicant respectfully submits the rejections under 35 U.S.C. § 102 have been overcome.

Response to 35 U.S.C. § 103 rejections

Claims 3, 4, 9, 10, 13, 15-20, 22, 24, 25, and 27 were rejected as being unpatentable under 35 U.S.C. § 103 in view of various combinations of Zhou, Smith, Gay, and Chen. Applicant submits claims 1-36 are patentable under 35 U.S.C. § 103 in view of the cited references.

None of the references alone or combined, teaches or suggests incorporating a codec within a same integrated circuit as a signal processor that provides linefeed driver control signals in response to sensed tip and sensed ring signals.

Smith includes a disclosure of an eight line (channel) subscriber line card arrangement where each of the eight subscriber lines is interfaced by a high voltage analog circuit followed by a low voltage circuit. A single CMOS digital signal processor is multiplexed between each channel to save digital hardware. If the DSP is performing codec functions, applicants submit that the DSP is not sensing tip and ring lines of the subscriber loop (Smith col. 2, lines 12-63).

Gay discloses method/apparatus for balancing a SLIC. Gay does not appear to teach or suggest a codec residing within a same integrated circuit as a signal processor that senses the tip and ring lines.

Chen's codec does not reside within a same integrated circuit as any signal processor that senses the tip and ring lines. (Chen, Fig. 1)

Zhou discloses a SLIC capable of determining the hookswitch status of subscriber equipment. Referring to Figure 3, converters 314 appear to perform at least some function similar to a codec (Zhou, col. 6, lines 30-51). Applicant submits there is no teaching or suggestion that the codec resides within a same integrated circuit as the signal processor that senses the tip and ring lines.

*Thus none of the cited references, alone or combined, teaches or suggests incorporating a codec within a same integrated circuit as a signal processor that provides linefeed driver control signals in response to sensed tip and sensed ring signals.*

In contrast, claim 1 includes the language:

1. A subscriber loop interface circuit apparatus comprising:  
a signal processor having sense inputs for a sensed tip signal and a sensed ring signal of a subscriber loop, wherein the signal processor generates a linefeed driver control signal in response to the sensed signals, *wherein the signal processor resides on a same integrated circuit die as a codec for bi-directional communication of voiceband data between the analog subscriber loop and a digital interface of the signal processor.*

(Claim 1, as amended)(*emphasis aadded*)

5. An apparatus comprising:  
a signal processor generating subscriber loop control signals in response to a sensed tip signal and a sensed ring signal of a subscriber loop; and  
a linefeed driver portion for driving the subscriber loop in accordance with the subscriber loop control signals, the linefeed driver portion providing the sensed tip and ring signals, wherein each of the linefeed driver portion and the signal processor resides on an integrated circuit die, *wherein the signal processor resides on a same integrated circuit die as a codec for bi-directional communication of voiceband data between the analog subscriber loop and a digital interface of the signal processor.*

(Claim 5, as amended)(*emphasis aadded*)

15. A subscriber loop interface circuit apparatus comprising:  
*a signal processor having sense inputs for a sensed tip signal and a sensed ring signal of a subscriber loop, wherein the signal processor computes common mode and differential mode components of the subscriber loop; and*  
*a codec for converting digital voiceband data from a digital voiceband interface of the signal processor to analog voiceband data for communicating to the subscriber loop, the codec providing bi-directional voiceband data conversion between the analog subscriber loop and the digital voiceband interface of the signal processor, the codec and signal processor residing within a common integrated circuit.*

(Claim 15, as amended)(*emphasis aadded*)

21. A subscriber loop interface circuit apparatus comprising:  
*a signal processor configured to receive a sensed tip signal and a sensed ring signal of a subscriber loop, wherein the signal processor generates subscriber loop linefeed driver control signals in response to the sensed tip and ring signals; and*  
*a codec for converting digital voiceband data to analog voiceband data for the subscriber loop, the codec and signal processor residing within a same integrated circuit.*

(Claim 21, as amended)(*emphasis aadded*)

Applicant thus submits claims 1, 5, 15, and 21 are patentable under 35

U.S.C. § 103 in view of the cited references.

Given that claims 2-4 depend from claim 1, claims 6-14 depend from claim 5, claims 16-20 depend from claim 15, and claims 22-36 depend from claim 21, applicant submits claims 2-4, 6-14, 16-20, and 22-36 are likewise patentable under 35 U.S.C. § 103 in view of the cited references.

Applicant submits the rejections under 35 U.S.C. § 103 have been overcome.

Conclusion

In view of the arguments presented above, applicant respectfully submits the applicable rejections and objections have been overcome. Thus claims 1-36 should be found to be in condition for allowance.

If there are any issues that can be resolved by telephone conference, the Examiner is respectfully requested to contact the undersigned at (512) 306-9470.

Respectfully submitted,

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